

I CLAIM:

1. A method for forming a solder joint in electronic assemblies having one or more copper bond connection sites, the method comprising the steps of:
 - applying a nickel layer to at least one copper connection site;
 - applying a copper layer to the nickel layer;
 - applying a solder ball to the copper layer;
 - reflowing the solder thereby forming a solder joint.
2. A method according to claim 1 further comprising a step of applying a flux material to the copper layer prior to applying the solder ball.
3. A method according to claim 1 wherein the nickel layer is applied to a thickness of greater than about 1 micron.
4. A method according to claim 1 wherein the nickel layer is applied to a thickness of less than about 5 microns.
5. A method according to claim 1 wherein the nickel layer is applied to a thickness within the range of approximately 1 micron to approximately 5 microns.

6. A method according to claim 1 wherein the copper layer is applied to a thickness of greater than about 0.6 micron.
7. A method according to claim 1 wherein the copper layer is applied to a thickness of less than about 6 microns.
8. A method according to claim 1 wherein the copper layer is applied to a thickness within the range of approximately 0.6 micron to approximately 6 microns.
9. A method according to claim 1 wherein the step of applying the nickel further comprises both electrolytic and electroless plating.
10. A method according to claim 1 wherein the step of applying the copper layer further comprises both electrolytic and electroless plating.
11. A method according to claim 1 wherein the step of reflowing the solder further comprises the formation of Cu_6Sn_5 for forming a bond between the copper layer and the solder.

12. A solder joint for a semiconductor apparatus assembly, wherein the assembly has at least one copper connection site, the solder joint comprising:

- a nickel layer on at least one copper connection site;
- a copper layer atop the at least one nickel layer; and
- a solder ball coupled to the copper layer forming a bond.

13. A solder joint according to claim 12 wherein the bond comprises Cu_6Sn_5 .

14. A solder joint according to claim 12 wherein the nickel layer comprises nickel having a thickness of greater than about 1 micron.

15. A solder joint according to claim 12 wherein the nickel layer comprises nickel having a thickness of less than about 5 microns.

16. A solder joint according to claim 12 wherein the nickel layer comprises nickel having a thickness within a range of between approximately 1 micron and approximately 5 microns.

17. A solder joint according to claim 12 wherein the copper layer comprises copper having a thickness of greater than about 0.6 micron.

18. A solder joint according to claim 12 wherein the copper layer comprises copper having a thickness of less than about 6 microns.

19. A solder joint according to claim 12 wherein the copper layer comprises copper having a thickness within a range of between approximately 0.6 micron and approximately 6 microns.

20. A BGA comprising:

- a board having a plurality of metallized connection sites;
- a nickel layer on a plurality of the metallized connection sites;
- a copper layer atop a plurality of the nickel layers; and
- a solder ball coupled to the copper layer forming a bond.

21. A BGA according to claim 20 wherein the bond comprises Cu_6Sn_5 .

22. A BGA according to claim 20 wherein the nickel layer comprises nickel having a thickness of greater than about 1 micron.

23. A BGA according to claim 20 wherein the nickel layer comprises nickel having a thickness of less than about 5 microns.

24. A BGA according to claim 20 wherein the nickel layer comprises nickel having a thickness within a range of between approximately 1 micron and approximately 5 microns.
25. A BGA according to claim 20 wherein the copper layer comprises copper having a thickness of greater than about 0.6 micron.
26. A BGA according to claim 20 wherein the copper layer comprises copper having a thickness of less than about 6 microns.
27. A BGA according to claim 20 wherein the copper layer comprises copper having a thickness within a range of between approximately 0.6 micron and approximately 6 microns.